

John Hunter 16th Sept 93.

THE
BUXTON MANUAL:

OR,
A TREATISE
ON THE
NATURE and VIRTUES
OF THE
WATERS of BUXTON;

To which is prefixed,
An Account of the External and Internal Use of
Natural and Artificial
W A R M . W A T E R S
AMONG THE
A N T I E N T S.

By A. HUNTER, M.D. F.R.S.

The FIFTH EDITION.

*Publica morborum requies, commune medentum
Auxilium, præsens Numen, inempta Salus.* CLAUD.

Y O R K :

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25-6-1

TO
JOHN CARR ESQ^R.
AS A PRIVATE
TESTIMONY OF REGARD
FOR HIS
MANY EXCELLENT QUALITIES,
AS WELL AS A
PUBLIC APPROBATION
OF THE
ELEGANT BUILDINGS,
PLANNED AND EXECUTED BY HIM,
FOR THE USE OF
THE SICK AND INFIRM WHO
FREQUENT THESE BATHS,
THIS TREATISE IS
DEDICATED
BY
THE AUTHOR.

P R E F A C E.

I Have no other motive for the publication of these observations, than a sincere desire to contribute to the ease and satisfaction of the infirm.

And as this Treatise may occasionally be consulted by persons unacquainted with medicine, I have, for that reason, endeavoured to make the whole as plain and concise as possible.

YORK, August 10, 1765.

A
T R E A T I S E
ON THE
NATURE and VIRTUES
OF THE
WATERS of BUXTON.

C H A P. I.

Natural History of Warm Waters.

I Believe I may venture to lay it down as a general rule, that there are few Diseases incident to the human Body which may not be palliated, or totally removed, by the judicious use of water, considered, according to the nature of the distemper, either as pure and elementary, or as saturated with principles of a medicinal quality.

Some

Some of the antient Philosophers distinguished the element of water by the appellation of *Omni-seminaria*, or Seminary of all created things. *Diogenes Laërtius* tells us, that *Thales* the *Mile-sian* was the first who taught this doctrine, and since his time a few of the moderns have in some degree adopted his system.

Agricola informs us that not only stones, but also several sorts of fossils and metals have been discovered in a soft and yielding state; and from thence concludes, that water is the original basis of every natural production. If we examine the Embryo State of nature, we shall find a great deal of truth in this Observation. The hardest bones of Animals were once a soft Jelly, and the hardest grains and seeds were once a drop of viscid water, inclosed in a tender pellicle. *Milton* perhaps alludes to this Philosophy of *Thales* when he says,

On the watry calm
His brooding wings the Spirit of God outspread,
And vital virtue infus'd and vital warmth
Throughout the fluid mass.

If

If we consider man in a state of health, we shall find the Earth productive of every thing necessary to keep him so. If we consider him as diseased, we shall find the same soil ready to relieve him. The bountiful Earth every where offers to his hand plants of a healing nature, and from her bowels pours forth medicated streams for his relief.

Every extensive Kingdom, that we know of, abounds with medicated waters both hot and cold. Thus we may observe the Author of nature studiously watching over the welfare of every nation of men. He regards not their complexion. The *Æthiopian*, the *Cherokee*, and the *Caffrarian* share, with the civilized *European*, the means of restoring health as well as preserving it.

Pure spring water has the appearance of a homogeneous fluid; but, upon examination, we find it heterogeneous, containing salts of different kinds and a portion of earth; principles not to be separated from it without extreme violence. Mr. Boyle endeavoured to separate water from its earth

earth by repeated distillations, but after distilling it a hundred times over, it still continued to deposite some earthy particles; from whence he justly concluded that there was no such thing in nature as elementary water.

Philosophers have differed much in their opinions about the cause of heat in warm waters; but I do not find that any of them have as yet been able to lay down an Hypothesis which is not liable to some objections. It is, no doubt, useful to know the different Strata through which the waters pass; but to conclude them hot or cold because they run through particular earths, is certainly too presumptive. *Hoffman* says that waters passing through beds of the *Pyrites Aureus* become warm; but we know of waters absolutely cold, which run through the same kind of substance. It is indeed true that the *Pyrites*, when laid in heaps and watered, becomes warm, and emits a great deal of smoak; but to conclude from thence that the heat of Baths proceeds from the like process in the bowels of the earth, would be saying, in other words, that

all

all hot waters pass through beds of the *Pyrites*, the contrary of which is well known. Again, if the *Pyrites* was the cause of heat, it will be difficult to understand how this heat should continue uniformly the same for so many ages: for when once the *Pyrites* is heated by water, as in the experiment upon it in the open air, it becomes decomposed, and the heat soon after ceases. Now, unless there should be a constant supply of fresh *Pyrites* in those meanders through which the waters pass, I cannot conceive how this heat should be kept up so long, and with such an equal temperature; and we know it would be absurd to suppose such a regular succession. What then occasions this heat in warm waters? I confess I know not. However, it is a singular happiness that the point in dispute does not seem to be any great obstacle to our forming a true judgment of the virtues of medicated waters. *Hoffman* was not the first who ascribed the heat of mineral waters to this cause; *Berger* and *Lister* had done it before him.

Equal parts of Iron filings and Sulphur, made
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into a mass with water, will, in a few hours, grow exceedingly warm, and in time emit sulphureous flames. This experiment has induced some Naturalists to imagine a mixture of these two bodies to be the cause of heat in all warm Springs. If the union of Sulphur and Iron were the constant cause of heat in medicated waters, we should always find them greatly saturated with those principles. But we undoubtedly know that the waters of *Bath*, in *Somersetshire*, contain only a small portion of Iron, and nothing of what really deserves the name of Sulphur ; and those of *Aix-la-Chapelle*, though they contain Sulphur, give no signs of Iron ; yet both of them are found to issue warm from the earth, and retain their native heat a considerable time. On the contrary, the *Geronsterre* water, though impregnated, to a considerable degree, with Iron and Sulphur, is, notwithstanding, remarkably cold.

If we carefully examine all the principles impregnating hot waters, we shall find them so very different in different Springs, and so little proportioned to the heat in each water, as to make it
very

very unreasonable to deduce the cause of heat from the quality of their respective minerals. Could we but once clearly demonstrate the cause of subterraneous fires and volcanos, we might then, very probably, reason with more certainty upon the present Inquiry; for it is commonly observed in *Italy*, and in the Island of *Sicily*, that there are several warm springs in the neighbourhood of those places where the subterraneous fires break out into flames and smoak; and in that part of *Bohemia* where the *Caroline Baths* arise, there were formerly eruptions of fire from the earth, as *Agricola* and *Balbinus* testify; and *Hoffman* tells us that the earth, in that district, was, in his time, warm, in many places, to the touch.

It will here be necessary to observe, that the heat of all these waters is various in degree, from the temperate ones of *Buxton*, *Bristol*, and *Mallow* in *Ireland*, to the hot ones in *Iceland*, which are said to be equal to the heat of boiling water.

The Chemical examination of mineral waters has, during this Century, been much attended to,

and certainly a knowledge of the component parts of any heterogeneous substance must greatly assist in establishing its virtues upon a reasonable foundation. *Hoffman*, whose great abilities in Physic as well as Chemistry every one is acquainted with, was amongst the first who gave us a just and true Analysis of mineral waters. Before his time it was usual to attribute their Virtues to Gold, Silver, Quicksilver, Tin, Lead, &c. as appears from the learned *Andreas Baccius* in his book *De Thermis*, and upon these erroneous data the Antients founded their practice with regard to medicated waters.

C H A P. II.

The Opinion of the Antients on the external Use of Natural and Artificial Warm Waters.

THE custom of bathing in warm water, whether made artificially so, or flowing naturally from the earth, appears to have been very antient, but we do not find it used so early with a design to remove diseases. Warm Baths were in great repute among the Eastern Nations,

as

as the *Jews, Medes, Persians, and Inhabitants of the Lesser Asia*, but very probably were only used at first as purifiers of the skin from dust and sweat; inconveniences to which those nations, from the warmth of their climate and their manner of dress, must have been greatly liable. Luxury, in a little time, made them still more frequent; and we find that *Xenophon*, in describing the effeminate manners of the *Persians* and other *Asiatics*, calls them *Balneatores, Pocillatores, &c.* In the time of *Hippocrates* we learn, that bathing in springs of warm water was recommended with a medical intention; and perhaps this is the most early authority we can produce of their use in medicine. *Plato* recommends them in several diseases, as well as for their admirable faculty of restoring strength and vigour to bodies worn out by hard labour.

Aretaeus, who seems to have been prior to *Galen*, prescribes the warm sulphureous Baths in the *Elephantiasis*, and, on account of their relaxing property, recommends them much in the cure of Melancholy. *Galen* in many places takes notice

notice of the admirable Effects of warm bathing in various diseases, as abundantly appears in his *Treatise De Temperamentis*; and in *Method. Med.* he gives us very particular directions for bathing patients emaciated by a hectic fever.

A great deal more of the practice, with respect to bathing in natural and artificial warm waters, may be seen in the works of *Cælius Aurelianus*, *Oribasius*, *Aëtius*, *Alexander Trallianus*, and *Paulus Ægineta*.

It does not appear, from any part of antient history, that the *Romans* made use either of natural or artificial warm Baths till they became acquainted with the *Greeks* and *Asiatics*, among whom warm bathing, as I have observed, was carried to a great excess. At first the rich established Bagnios in their own houses for the convenience of themselves and visitors; but in a little time the custom of bathing became so prevalent, that it was esteemed to be as essential to health as nourishment itself. Hence we find the state provided Baths for the use of the poorer citizens,
where

where they had the liberty of bathing at a small expence, as we learn from *Horace*;

—dum tu quadrante lavatum
Rex ibis.—

Agrippa, in his Ædileship, is said to have built upwards of one hundred public Baths. After his example, *Nero*, *Vespasian*, *Titus*, *Domitian*, and many of the succeeding Emperors, with a view to gain the affections of the people, erected public Baths enriched with the finest marble, and built according to the rules of the most delicate architecture. At the first institution of private Baths among the most wealthy citizens, it does not appear that they studied magnificence so much as use and convenience; but as soon as the *Roman* conquests became considerable, and the practice of pillaging the Provinces began, we find they altered the original plainness and simplicity of their Baths, and vied with each other in the Elegance and Grandeur of them. Of these the Poet *Statius* says,

*Nil ibi Plebeium, nusquam Temesæa notabis
Æra, sed argento-felix propellitur unda,
Argentoque cadit, labrisque nitentibus instat
Delicias mirata suas, et abire recusat.*

These superb Baths, however, were far inferior in beauty and extent to those called *Thermae*, which were almost all built by the Emperors for the public use, and in which their principal view seems to have been to display their magnificence, nothing being omitted that could heighten the Idea of it.

Besides a number of rooms and other conveniences set apart for Bathing, there were places allotted, in these extensive buildings, for all the manly exercises of the body, as leaping, running, wrestling, throwing the discus, &c. and even for those of the mind, as it was customary for the Rhetoricians and Philosophers to assemble daily under the Porticos for the instruction of the youth. They also contained libraries, to which the studious were invited: Witness the famous *Bibliotheca Ulpia*, which had been placed by the Emperor

Emperor *Trajan* in the *Forum Trajani*, but afterwards removed to the Baths of *Dioclesian*.

It may not be improper to observe, that at these places persons of all ranks met to discourse upon the news of the city : Hence we may understand the reason why the poets gave them the epithet of *Garrulæ*. Works of genius and learning, as well as wit and humour, were frequently read there.

The *Thermæ* of *Dioclesian* and *Caracalla* were the most extensive and remarkable of any built by the Emperors, many parts of which still remain. *Lipsius* assures us that those of *Caracalla* were so extensive that two thousand persons might bathe in them at the same time ; and we are told that no less than forty thousand Christians were employed many years in erecting the magnificent ones of *Dioclesian*.

The pavement of these *Thermæ* was of marble and mosaic work, and the walls were covered with paintings of great value ; but the prodigious

number of marble statues, figures and vases, brought from the conquer'd Cities of *Greece* and *Asia*, constituted their greatest ornament. These, with the striking grandeur of the architecture, the beautiful and stately pillars, the curious vaulting of the roofs, and the number of spacious apartments, serve conspicuously to shew the riches and elegance of the *Roman* Emperors.

Thus much for the general account of the antient Baths, the truth of which is confirmed by the concurring testimonies of Antiquity. As to the parts immediately subservient to bathing, we find them but very imperfectly described either by the Antients or Moderns. *Vitruvius*, amongst the Antients, has given us their internal structure; but, upon a minute examination, he will be found to differ essentially from other writers upon the same subject. Public buildings, erected for convenience as well as ornament, may very well be expected to differ in the disposition of the parts intended for use; and that may account for the various descriptions transmitted to us of the internal parts of the antient Baths. *Montfaucon*,
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in his *Antiquities*, has given us a fine view of the inside of a *Roman* Bath from a painting found in the *Thermæ* of *Titus*, which represents all the parts very distinctly.

According to the best Authors, the place set apart for bathing consisted of six rooms, which had a ready correspondence with each other. There was first the *Frigidarium*, where the Bathers undressed and rubbed; then the *Tepidarium*, or warm room, where they remained till the pores of the skin were gently opened; from thence they went into the *Laconicum*, which was some degrees warmer; and after staying there a short time they passed into the *Sudatio*, or sweating-room, where they were again rubbed, and sometimes anointed with oil; from thence they directly entered the hot Baths. The floors of these hot rooms were hollow on account of the *Hypocaustum*, which was a large furnace underneath, supplied with wood, the heat of which was communicated to the stoves by means of the vacuity. The same furnace also heated another room, called *Vasarium*, situated near the stoves, wherein were placed

three large vessels, called *Milliaria*, by reason of their capacity, one for hot water, another for warm water, and a third for cold ; being so contrived that the water might be readily distributed by pipes and cocks into the neighbouring Baths, according to the occasion of the Bathers.

I must here observe, that the room called *Laconicum* is wanting in the painting above-mentioned, and the word is wrote over a kind of furnace ; but *Vitruvius* expressly mentions it not as a furnace, but as a sweating-room. Some pretend that it was the same as the *Tepidarium* ; but I have ventured to proceed upon the authority of *Vitruvius*, who expressly says that the *Laconicum* and *Sudatio* are to be joined to the *Tepidarium*. *Laconicum Sudationesque sunt conjungendæ Tepidario.* Vitruv. v. x. by which he plainly distinguishes these three places.

The method of bathing was there very different from what is practised at our Bagnios, for they never had their whole bodies immersed in water, unless by direction of the Physician.

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They usually seated themselves in the Bath upon a low seat, or stool, called *Solium*, with their legs, and sometimes their thighs, covered by the water. In the mean time the water, tempered according to their inclination, was poured upon their heads and shoulders, by slaves, from urns made for that purpose. Their bodies were well rubbed with a sponge, and scraped with a crooked instrument called a *Strigil*. This operation being finished they returned to the *Sudatio*, where they remained a short time; and passing through the *Laconicum* went into the *Tepidarium*. From thence they repaired to the *Frigidarium*, where they usually received a sprinkling of cold water; after which they were conducted into a room called *Elaeothesum*, where they were wiped dry, and anointed with perfumed oils, and then dismissed to supper.

The vessel in which they bathed seems to have been contrived to receive only one person at a time, and was either of marble, oriental granate, or porphyry, though of an extraordinary size, as may be judged from those which have been found in the ruins of the antient *Thermæ*. Besides these large

large bathing vessels, there were reservoirs of cold water for such as desired to exercise themselves in swimming; so that nothing was wanting that could add to the grandeur of the founder, or contribute to the health or amusement of the citizens.

At the first establishment of public Baths there were distinct ones for the men and women; but in a little time they became common, with this difference, that each was waited on by slaves of their own sex. *Adrian*, perceiving the indecency of this custom, published an edict, prohibiting the promiscuous bathing of the sexes. *Marcus Aurelius* did the same; but *Heliogabalus* suppressed those ordinances, which were again revived, but with little success, by *Alexander Severus*: so that this indecent custom subsisted a considerable time, even among the Christians, notwithstanding the many remonstrances of the ministers of the church, and was not entirely abolished 'till some time after the death of *Constantine the great*.

CHAP.

C H A P. III.

*The Opinion of the Antients on the internal Use
of Natural Warm Waters.*

IN the last chapter I have given a concise account of the antiquity of bathing in natural and artificial warm waters: I shall now examine into the opinion of the Antients concerning the internal use of medicated waters, and in the course of this Inquiry I shall take notice of what they say concerning the cold springs, as well as those which are hot.

Strabo, in his fifth book, makes mention of several springs which were serviceable when drank as well as bathed in; and *Athenæus* tells us of a fountain in *Paphlagonia* which had an inebriating quality, to which the inhabitants of the country frequently resorted.

Vitruvius has a whole chapter on warm and cold springs, wherein he describes their medicinal virtues when used internally. He says that bituminous

tuminous waters are of great service in many disorders of the body, and in several places abundantly shews that the internal use of medicated waters was much attended to by the Antients.

Scribonius Largus, who lived in the reign of the Emperor *Claudius*, recommends the use of warm water, in which steel has been quenched, in several diseases of the bladder, and informs us that he learned this practice from observing the good effects of a certain chalybeate spring, famous for curing diseases of that part.

Seneca, speaking of warm and cold medicated springs, has these remarkable words, *Quædam enim oculos, quædam nervos juvant, quædam inventerata et desperata a medicis vitia percurant. Quædam medentur ulceribus, quædam interiora fovent potu, et pulmonis ac viscerum querelas levant. Quædam suppressimunt sanguinem.*

Quæst. Natural. Lib. III.

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The waters of *Spa* are certainly very antient, for *Pliny* speaks of them, and particularly mentions the chalybeate taste which they leave on the palate after drinking. He also takes notice of a great many other medicated springs in *Italy*, *Syria*, *Æthiopia*, *Greece*, *France*, *India*, *Arabia*, *Phrygia*, *Germany*, and other countries, and bestows much pains in describing their virtues as well when externally applied, as when drank at the fountain. It is not quite clear whether *Galen* ever made use of medicated waters in any other manner than as Baths, though *Le Clerc*, from a very obscure passage, is inclined to think he did. *Cælius Aurelianus*, recommends the internal use of warm medicated waters, and gives us very particular directions concerning them. Those who are desirous of being more fully informed upon this subject, may consult the works of *Oribasius*, *Aëtius*, *Alexander Trallianus*, and *Paulus Aegineta*.

From all these concurring testimonies we may venture to conclude that the Antients held the use of mineral waters in some estimation, though,

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from

from their ignorance of Physiology and true Philosophy, their practice with regard to them appears imperfect. In general they took experience for their guide ; but whenever they attempted to reason upon the nature and cause of diseases, they were sure to err, the functions and uses of the different parts of the human body being, in those distant ages, but imperfectly known. And here it may be proper to observe, that the divine *Hippocrates* seldom made use of Physiological reasoning in the cure of diseases ; he trusted to observation and experience, and it is amazing to what certainty he brought his practice. How happy would it have been if many of his Successors had followed his example ! Instead of bewildering themselves with idle Theories, built upon the most ridiculous foundations, they ought to have followed nature, and, like the divine *Sage*, traced her through her different meanders. She would have taught them wisdom ; but, in medical, as well as in some kinds of religious inquiries, *professing themselves wise they became fools*. Happily for us, the illustrious *Harvey*, in the year 1616, discovered the circulation of the blood. In conse-

quence

quence of this important discovery a more rational Theory of diseases was established, and Medicine, which for many ages had appeared as an occult science, instantly became clear and demonstrative. Theory and Practice are now happily united. *Nihil est quod hæc conjuncta non efficiant, cum interim disjuncta parum profunt.*

Keil. Tentam.

C H A P. IV.

The Virtues of Buxton Waters.

HAVING thus premised a general account of warm waters with their external and internal use, as prescribed by the Antients, I shall now begin to examine into the nature and virtues of those of *Buxton*: and first I propose to ascertain, as near as possible, their component parts; after which I shall give an account of the different diseases for which they may be prescribed as an internal remedy; and lastly say something upon the warm Bath, with proper observations

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upon

upon its use, and in what diseases it ought to co-operate with drinking the waters.

The waters made use of by the company who resort to this place, are taken from a well dedicated to St. *Ann*. From several remains of *Roman* antiquity which have lately been discovered, it is probable that these waters were used very early as a bath; but the precise period when it became customary to drink them remains, as yet, unknown. The water that supplies the baths seems to be of the same nature with that of the well. The baths are under cover, and are well provided with every thing necessary to render them perfectly convenient and useful.

Experiments made upon the waters by *Fahrenheit's Thermometer*, shew them to be considerably colder than those of Bath, but some degrees warmer than those of Matlock and Bristol.

B A T H.

Cross Bath pump	—	—	110
King's Bath pump	—	—	112
Hot Bath pump	—	—	114 $\frac{1}{2}$

B U X T O N.

BUXTON.

St. Ann's well	—	—	—	81½
Baths	—	—	—	82

BRISTOL.

Hot Well Pump	—	—	—	76
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MATLOCK.

Spring	—	—	—	66
Baths	—	—	—	68

To ascertain the solid contents of the waters, I ordered four gallons of the water to be carefully evaporated over a gentle fire, and obtained five scruples of a mix'd composition, whereof one drachm was a light blue-coloured earth, and the remaining two scruples, by all the trials I could make upon them, appeared to consist of a native alkaline nitrous salt, with about an equal portion of marine salt. I know that Dr. *Short*, as well as the ingenious Dr. *Rutty*, who seems to proceed upon his authority, calls the salt truly nitrous; but I am very confident that the salt in these

these waters is not so neutral as the common nitre of the shops.

As to the earth, I could not perceive any principles in it, either sulphureous or chalybeate, so that I think it may be justly esteemed an inert absorbent earth.

I also tried the waters fresh from the spring, and found them of a temperate warmth, quite clear and transparent, and not in the least betraying to the taste any signs of heterogeneous particles. Upon trial with several sorts of liquors they gave no signs of Iron or sulphur in their composition, nor of any kind of acidity; on the contrary, they raised a gentle effervescence with spirit of vitriol; but that I esteemed more as a proof of their absorbent earth, than alkaline salt; which last, as I have observed, bore but a small proportion to the quantity of water and calcarious earth.

The Rev. Mr. *Mellar*, a late worthy incumbent of the parish of *Buxton*, informed me that he evaporated, at the desire of the late Lord *Longdale*,

dale, about 100 gallons of these waters down to three quarts, which were sent to *London*, and there chemically examined; the result of which examination was, that they were found to contain, besides earth, marine salt and nitre, a portion of bitumen, which had an aromatic smell, somewhat resembling the balsam of *Guaiacum*. However, I was not able to obtain the least appearance of such an ingredient; neither could I apprehend any reason to suppose the existence of what Dr. *Short* calls impalpable sulphur.

The experiments I made upon these waters were conducted with the greatest accuracy and attention; but as I have no great opinion of Chemical learning in these things, I have purposely omitted a detail of them. I am ready to acknowledge that the separation of the component parts of any unknown body, appears a rational method of arriving at the knowledge of its virtues; but after we have separated the different salts and other principles latent in mineral waters, we shall find, after all our labour, but very slender proofs from whence we ought to draw any practical inferences.

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ferences. From a very early period the waters of *Bath* were supposed to contain sulphur and nitre; but we are now told, and perhaps with truth, that they contain neither; yet, notwithstanding this important discovery, we do not find the practice, with respect to them, either altered or amended. Chemistry may assist our inquiries, but experience must determine our opinions; and this observation bears the strongest application, when made to those waters commonly called calcarious, whose principles, every one considered separately, are but very inactive. Besides, it may be proved, from reason and experiment, that the constituent principles of most natural bodies, when separated, are found to act upon the human body very differently from what they would have done, if they had been permitted to remain united by the Chemistry of nature.

I am as sensible as any man of the great advantages that medicine has received from Chemistry within these last fifty years. I do not mean to reflect upon the Art or the Professors of it, I only blame them for shewing so much of the

Chemist

Chemist and so little of the Physician ; for if we examine the writers upon mineral waters, we shall find, in general, near two thirds of their works taken up with experiments and corollaries, as if the practical part of medicine were of little or no service to the community.

Notwithstanding what the Chemists may say to the contrary, I am convinced that a just representation of cases, with proper observations upon them, will be found, after all, to be the most rational method of arriving at the true knowledge of the virtues of mineral waters.

I have therefore endeavoured to avoid what I here censure, by barely mentioning the contents of the waters as they appeared to me from experiments; and by that short method I have made those pages subservient to Medicine, which are usually devoted to Chemistry. An exchange, I hope, for the better.

Buxton waters, in common with a great many others, are observed, upon first drinking, to affect

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the head with a sort of inebriating giddiness, attended with a sense of universal fulness and drowsiness; but after using them a few days these sensations go off, and are seldom or never perceived afterwards. This quality in waters does not seem to have escaped the attention of the Antients; *Athenæus* and *Vitruvius* make mention of it, and *Ovid* poetically describes it:

*Cui non audita est obscœnæ Salmacis undæ?
Æthiopesque lacus? quos si quis faucibus hausit,
Aut furit, aut mirum patitur gravitate soporem.*

Metamorph.

The spirit that occasions these appearances is so extremely fugitive, that it immediately flies off when exposed to the air; for which reason all waters must be best when drank at the fountain. I am inclined to think that a great deal of the virtue of medicated springs proceeds from the grateful sensation produced upon the tender coats of the stomach by this volatile spirit, besides what may arise from its increasing the motion of the blood, and forwarding the circulation of the fluids

in

in those vessels which naturally feel but little from the impulse of the heart and arterial system.

This highly volatile and subtilized spirit is most apparent in those waters which are commonly, though improperly, termed *Acidulæ*, and in a small degree is observed in the calcarious kinds, such as those of *Buxton*, *Matlock*, *Bristol*, and *Mallow* in *Ireland*.

It is usual to attribute the virtues of mineral waters to their spirit, salts, and earth, having little regard to the pure element; but I am of opinion that as the contained quantity of these principles is so small in each dose of the waters, they ought in general to be considered only as assistants, and not as very active agents in themselves. *Hoffman* tells us that the waters of *Schleusingen*, in the principality of *Henneberg*, are of admirable service in the Stone and Gravel, Gout, Rheumatism, and Scurvy; yet they are found to contain not the least portion of mineral matter. The same may be said of the baths of *Teplitz* in *Germany*, of the waters of *Pfeffer* in *Switzerland*, and those of

Pisa, Tetuccia, and Noceria, in *Italy*, whose contents no way differ from those which are observed in pure spring water. The waters of *Malvern, Ilkley*, and perhaps *Bristol*, may be considered in the same light. All these, notwithstanding, are found to be effectual remedies in many diseases. Whence then proceeds their efficacy? Certainly from the elementary water which is their basis.

As *Buxton* waters, and those of the calcarious kind, seem to have no operation different from common water, except in being a little more diuretic, we may reasonably suppose them to produce their good effects more by the elementary water, which is their basis, than by any other of their principles.

Pure water, as it betrays neither taste nor smell, must be admirably calculated to correct the acrimonious state of the fluids, from whatever cause it may arise; and if any thing upon earth can be considered as an universal remedy, it must be water.

A steady and uniform course of this pure element, assisted by exercise and a proper regimen in diet, will do more in removing some diseases than all the pharmaceutical preparations that we know of.

The subtilty of the parts of water is visibly shewn by the famous *Florentine* experiment of pressing it through the pores of gold, and from thence we must suppose it very capable of passing through the minutest vessels of the body; but it must be forcing and deterging in a more particular manner, when it happens to be impregnated with fossile salts and the volatile principle abovementioned.

The blood of a person in health betrays no signs either of an acid or alkaline nature; but is perfectly mild and neutral, containing salts resembling *Sal Ammoniacus*; however, in many diseases it is known to incline to an alkaline nature, though it is much doubted whether it ever approaches towards an acid. For my part I am inclined to think it does, and believe that an universal

universal acescency, though least suspected, is frequently the cause of many chronic diseases. Those people who have long lived on a crude farinaceous diet, and indulged in the free use of fruits of every kind, are constantly observed to have their bowels weak and full of wind, which is evident from their sour eructations. Now when once the chylopoietic organs are become weak, and rendered unfit to subdue and concoct their vegetable contents, no wonder they are carried into the blood with a strong taint of their own nature, which is an acid; and so in process of time there is reason to suspect that the blood will become more acescent than is consistent with the welfare of the individual. It is a common and just observation, that in such persons the bile, which is by nature prone to putrefaction, has become watry and inactive, so that it has little or no power over the acescent diet. And that this correction of acescency is one of the material uses of the bile, is evident from the common experiment of mixing bitter herbs with malt liquors, to prevent their growing sour. In some diseases the sweat has been observed to smell remarkably

remarkably four; and I remember some years ago, during my attendance upon a patient who laboured under a nervous disorder, attended with a great inactivity of body and dejection of spirits, that the bed-cloaths, every morning, smelt truly acid. *Van Swieten* confirms this observation, when he says, *In morbis languidis aliquando sudor acidum spirans observatur.*

A long and continued use of vegetable acids is known to melt down the red part of the blood. Hence young ladies who have indulged in the free use of vinegar and other acids, with an intention to keep themselves thin, are frequently observed to fall into a bad habit of body, which is often not to be corrected by the most judicious management. In them we observe an universal laxity and paleness, occasioned by the dissolving power of the acids. As the whole method of cure consists in restoring the broken texture of the blood, and removing the obstructions in the glands and small vessels, there may be reason to expect great advantages from the use of mild alkalescent and absorbent remedies, such as the waters of *Buxton*.

I have endeavoured to shew that the blood may sometimes be of an acescent nature; and when that is the case, in whatever shape the disease appears, I believe nothing can be of more service than these waters, if continued a proper time.

Buxton waters are of particular service to people who are subject to bilious cholics; but the patient must be careful to assist them by observing a suitable regimen in his diet, avoiding all things of a hot stimulating nature, or such as have a tendency to exalt the humours. In this disorder they seem to operate by diluting the acrimonious bile, and thereby abating its stimulus; but as the retention of that humour, in its acrimonious state, may be attended with bad consequences, the Physician ought frequently to interpose gentle doses of rhubarb.

There is a cholic which attacks people of a scorbutic habit, and which seems to derive its origin from the acrimonious state of the humours. *Buxton* waters are found to be of singular service in that disorder, especially when accompanied with

with such remedies as tend to correct the impurities of the blood. In the flatulent cholic they are not much to be depended on, unless assisted by warm strengthening remedies: other waters of a more stimulating quality are therefore to be preferred.

In the habitual Cardialgia, commonly called the Heart-burn, they are found to be very useful; but to prevent a return of the disease after the waters are left off, the patient should have recourse to such remedies as are known to strengthen the coats of the stomach.

These waters, in the gentlest manner possible, restore the tone of the Stomach and Intestines, after severe Diarrhæas and Dysenteries, contracted at sea, or upon land; but the patient should be advised to begin with small doses, increasing the quantity as they are found to agree. A few grains of rhubarb, every third or fourth day, will be proper.

They are much recommended in habitual vomitings

mitings from too great irritability of the coats of the stomach, and in all disorders of the stomach and bowels, where gentle absorbent and strengthening things are proper, they may be prescribed with advantage: but as they sometimes prove too cold upon the stomach at first drinking, they may be corrected by mixing a tea-spoonful of tincture of cardamoms in each dose, until they are brought to agree without its assistance.

The fluor albus and immoderate fluxes of the menses, whether from laxity or an impoverished state of the blood, are gently and safely restrained by the use of these waters. In these complaints the warm bath must be absolutely forbid, and the patients should be advised to bathe in cold water.

Those who are subject to fits of the gravel frequently find great benefit from these waters, for they gently deterge the secretory vessels of the kidneys, and at the same time strengthen their tone, which is generally weak in such people, as *Hoffman* judiciously observes: *Toni reñalis nimia*

nimia resolutio, morborum qui renes occupant, potissima causa et origo est. Quia de causa, temperata astringentia et roborantia, in calculo tam preservando quam curando, palmam cæteris arripiunt.

It is an opinion commonly received, that the waters of *Buxton* are similar in their nature and effects to those of *Bath*, and on that account many gouty people endeavour to seek relief at *Buxton*, influenced by the vicinity of the place to their own habitations: but I am well assured that there is a most essential difference, both with respect to the drinking waters, and the bath. For in these waters we do not find any of the principles sufficiently heating, or of force enough to hasten the formation of the gouty matter, in order to its being thrown upon the extremities; neither are the waters of our bath sufficiently warm to relax the vessels for receiving it when it is formed. I have indeed, more than once, observed people to have a fit of the gout during their residence at *Buxton*; but then they were such as had a great deal of it in their constitution, and needed but little assistance to bring it on.

I would be understood to mean this only as a general observation; for there is a kind of inflammatory gout, for which the waters of *Bath* are by no means proper. In such cases those remedies which have a less degree of stimulus are always found to answer best. In that kind of gout the waters of this place are excellent.

Though the waters of *Bath* have greatly the advantage over those of *Buxton*, in almost all diseases which require a brisk motion of the blood and a powerful relaxation of the solids, they are, notwithstanding, much inferior to them in the cure of other distempers, as I shall endeavour to shew in a subsequent part of this treatise.

These waters have been famous, from the most early accounts, for the cure of rheumatic complaints, and in several kinds of the palsy they are deservedly to be preferred to *Bath*. There are two kinds of rheumatism, the acute and the chronic; but as the acute rheumatism does not require the use of the waters, I beg to be understood, throughout this treatise, as speaking of the

the chronic kind. This disease, both in its acute and chronic state, was known to the ancient Greek and Arabian Physicians, but is better described by the Moderns, for this plain reason, that their climates were warmer than ours, and consequently not so apt to produce the disease: Obstructed perspiration is the most frequent cause of this disease, and whatever gently opens the pores of the skin, must be expected to contribute to the cure; hence we may plainly see in what manner warm bathing produces such remarkable good effects. In the chronic rheumatism the blood is observed to be fizy and thick, but not so membranous and glutinous as the *Pituita inflammatoria* in pleuritic patients, nor so soft and yielding as what the Antients called *Pituita mucosa*, observed in the blood of ricketty children. As I am desirous of introducing as little Theory as possible, I shall not attempt to explain the particular manner by which these waters attenuate this lensor. I shall therefore only take notice of it as a fact supported by experience, which must be allowed to be the strongest evidence.

It is observable that those who go to *Buxton* on account of rheumatic complaints, find their pains increase after bathing, and drinking the waters for a few days, and perceive a sensation of fulness and uneasiness all over their bodies; but this is no unpromising sign, as it denotes that the impacted matter is attenuated and again absorbed into the circulation, which before had been obstructed in the small vessels running between the fibres of the muscles, and upon their tendinous expansions. They ought therefore to persist in bathing and drinking, taking care to avoid cold, which might prove of bad consequence, and endanger an attack of a rheumatic fever. If any particular joint be more affected than the rest, it must be well pumped and rubbed with a flesh-brush, in order to attenuate the impacted matter; but if, notwithstanding this treatment, the joint should continue rigid, it will be advisable to bathe it in the waters made warm by an artificial heat; and as the benefit of the pump cannot be obtained under such circumstances, the water may be poured upon the afflicted member from a tea-kettle. When the swelling

swelling happens to be of a cold and indolent nature, it will be proper to rub it with some penetrating application, such as the *Linimentum saponaceum*; at the same time a decoction of *Guaiacum*, with a few drops of any volatile alkaline spirit, may be used with freedom: but the most ready method of resolving rheumatic swellings, and relaxing contracted ligaments, is to expose the limb to the steams of boiling water, and afterwards to rub the parts affected with the softest oils. By this penetrating fomentation I have seen many rigid members restored to a great degree of mobility, after they had resisted the usual emollient applications. When the patient is freed from all his complaints, and the muscles and joints are become sufficiently moveable, he should be advised to bathe for a week or ten days in the sea, or any cold spring, in order to brace up the weakened vessels, without which there is no security against a relapse.

The electrical shock is a remedy much recommended for the cure of fixed rheumatic pains, and, within these few years, I have seen some remarkable

remarkable cures performed by that operation. The *modus operandi* of electricity has not hitherto been fully explained ; but if we may venture to form any judgment of it from its effects, we must suppose it to be one of the most rapid and penetrating things in nature. Experiments teach us that the texture of metals may be dissolved by its impulse, and how much more readily must the viscid rheumatic matter be agitated and attenuated ? A spring and oscillation is at the same time given to the obstructed vessels, by which means they more readily free themselves from the impacted load, and send it back again into the common course of the circulation.

Those who are subject to the rheumatism should constantly observe to keep the pores of their skin sufficiently open ; for which intention there is nothing better than the frequent use of the flesh-brush. I have known many rheumatic people receive great benefit from wearing a flannel shirt next their skin, which we know, from reason and experience, is a powerful promoter of insensible perspiration.

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These waters are serviceable in the scorbutic rheumatism, a disease which commonly attacks women, and men of a weakly constitution. It differs essentially from the genuine rheumatism. Its attacks are more irregular: They are seldom attended with any degree of fever, and rarely occasion any swelling. The judicious *Sydenham* has given us an excellent history of this disease.

It is usual for the gout, after a severe attack, to leave a great weakness upon the afflicted joint, which, if not properly braced up when the pain is gone off, is sometimes attended with inconvenience. The Baths in *Somersetshire* do not seem calculated for this intention, on account of their too relaxing quality. *Buxton* Bath is always found to answer in cases of this nature, which may very reasonably be expected, as it has a sufficient degree of coldness to brace up the relaxed fibres. If any gelatinous matter has settled under the *vaginae* of the tendons, or upon the ligaments, which is very common, it may be attenuated by remaining in the bath a longer time; and thus, according to the nature of the

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case, the patient may gradually shorten the time of bathing, till he arrive at a single immersion.

Buxton waters are in great repute on account of their success in paralytic disorders. I am afraid Physicians do not always sufficiently attend to the nature of the palsy: for without ever considering the cause of the disease, they are apt to recommend the frequent use of the cold bath as the only means of recovery. It generally may be said that the hot baths are better adapted to the cure of paralytic complaints, though, in many cases, the cold bath may be preferable to the hot. However, this necessary distinction is seldom made, as most people are fond of repairing to the same place where their friends have received relief, not considering that though the disease be the same, yet it may proceed from an opposite cause, and consequently must require an opposite treatment. This practical error, as well as a great many others, is owing to an imperfect knowledge of physiology, which often prevents Physicians from distinguishing the remote from the proximate cause of a disease, so that they are obliged

obliged to prescribe to the name only; a practice as common as erroneous. Dr. *Mead* observes, that paralytic patients are often seized with fits of an apoplexy immediately upon coming out of the warm baths, which indeed may be readily accounted for. If the palsy be of that kind called a *Paraplegia* or *Hemiplegia*, both which are commonly the crisis of an apoplexy, there is reason to apprehend a return of the original disease from the rarefying power of the water, and more especially if the patient be of a plethoric habit. I can hardly be brought to think that the celebrated author above-mentioned meant absolutely to condemn warm bathing in every species of the palsy, and in all its stages, though I must confess that what he says in his *Monita et Precepta Medica*, will bear no other interpretation than that warm bathing is hurtful to all paralytics. His words are, *Immersiones calidæ paralyticis omnibus nocent.* Lest the severity of this sentence, pronounced by so great a man against *Bath* waters, might have too powerful an influence over many paralytic people, Dr. *Summers* thought it necessary to produce the ac-

count of the General Infirmary at *Bath*, wherein he made it appear that a great number of patients labouring under every kind of the palsy, had received relief from the warm baths. For my part, I believe much may be said on both sides; but as this Performance will not admit of discussing the point in its full extent, I shall therefore leave it to be determined by others, and content myself with enumerating a few causes from whence palsies proceed, and leave the intelligent reader to his own judgment in the choice of the hot, temperate, or cold baths.

I may venture to say that most palsies proceed either from a retention of the natural perspiration, or from some morbid or critical matter falling upon the brain, *medulla spinalis*, or vaginal coat of the nerves, instead of being regularly expelled through some of the emunctories. The last kinds frequently succeed acute diseases, as *Van Swieten*, in his Commentary, observes. The ill effects of retained perspiration we may learn from *Hippocrates*, who says that during a continued moisture of the air, with a northerly wind,

wind, Paraplegias were almost epidemical; and *Sanctorius*, in his 67th Aphorism, explains the above observation, when he tells us that the natural perspiration flies off faster in cold dry weather, than when the air is cold and moist.

Daily observation informs us that palsies are often produced by lying in damp beds, or upon the ground exposed to a moist air; and in such cases it is apparent that a retention of the perspirable matter is the cause of the disease. The indication of cure directs us to open the pores of the skin by means of warm bathing, and cordial sudorific remedies. What could be expected from cold bathing in such cases?

It sometimes happens that palsies proceed from an absolute relaxation of the muscular parts, without any previous obstruction in the brain, nerves, or blood-vessels. This kind of palsy is generally hereditary, and attacks the patient by slow degrees, and for the most part is partial either to the upper or lower extremities. In such cases warm bathing would be certain destruction, while

while, on the contrary, the cold bath is plainly indicated.

The gout is sometimes observed to throw a little of the critical matter upon the brain or medulla oblongata, and sometimes upon the vaginæ of the nerves, at some distance from their origin. In such cases it may be judicious practice to prescribe the hot baths in *Somersetshire*, with an intention to attenuate the gouty matter, and to solicit its expulsion upon the extremities; but if so long a journey should be inconvenient, the patient may, with nearly the same advantage, make use of a Bath of *Buxton* water made some degrees warmer than natural, by means of an artificial heat, according to the improvement which I shall propose when I come to speak of the mechanical action of warm water upon the body.

When the bleeding piles have been imprudently stopped by topical remedies, the viscid blood, instead of being regularly thrown upon the hæmorrhoidal veins, sometimes falls upon the

the origin of the nerves, and produces an Apoplexy, Paraplegia, Hemiplegia, or a Palsy of the upper or lower extremities. The Menstrua, when obstructed, have been known to produce the same diseases; and it is a common observation that palsies do frequently arise from imprudently repelling some eruptions of the skin. In the above cases it evidently appears that cold bathing would be highly injurious, while, on the contrary, warm bathing, by its relaxing property, would prove of the greatest benefit.

As I have frequently made mention of the word Paraplegia, it will not be amiss to observe that the Antients did not receive it in the same sense that we do. With us, an inability to motion in all the voluntary muscles below the head, is called a Paraplegia; but by the Antients, a Palsy of any of the members of the body was distinguished by that name. Thus *Aretaeus*, after observing that Apoplexies, Paraplegias, and Palsies were much of the same nature, says, *Paraplegia autem est tactus motusque remissio, sed in membro uno, utpote manu vel crure.*

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It is a common practice to apply warm stimulating things to paralytic muscles ; but these can be of little or no service, as the cause lies at the origin of the nerve. Thus, if the inferior extremities are effected, all our topical applications should be made to the lower Vertebræ ; but if the upper extremities are paralytic, then our applications ought to be made, as near as possible, to the origin of the fifth, sixth, and seventh cervical nerves, and first of the dorsal. The whole of this practice is distinctly laid down by Alexander Trallianus ; his words are, *Si igitur ex superioribus partibus quædam affectæ fuerint, nempè oculus, nasus aut lingua, aut quædam in facie, constat, quod ipsum cerebrum habeat morbum, illique primario succurendum sit ; si ergo nulla ex prædictis partibus sensu aut motu aut utroque læsa fuerit, necesse est spinalem medullam laborare, aut aliquem nervorum ex ipsa prodeuntium affectum esse, statuere.* Attendito igitur diligenter, quæ sit pars affecta, aut unde initium trahat, aut a qua vertebra id aut nervo recipiat, atque illi curationem adhibeto : non autem, ut vulgo, symptomatibus tantum absistito. Itaque resolutas partes sic internos-

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cere oportet, animum scientiæ anatomicæ adhibendo.
Lib. I. cap. xvi.

The waters of *Buxton* are of so happy a temperature that they may be used either as a warm or cold Bath. The instant a person plunges into the water he receives a shock, nearly equal to what is felt upon going into river water in the middle of summer. In a few minutes the sensation of coldness goes off, and a most agreeable warmth succeeds, and if the patient remains in the Bath long enough, a relaxation of the vessels and muscular parts will ensue. This may justly be esteemed among the chief properties of *Buxton* water, in which it very widely differs both from *Bath* and *Matlock*; for in the one the waters are too hot, and in the other too cold to enjoy this advantage. When any obstructed matter has settled upon the Vaginæ of the nerves and occasions a palsy, or upon the ligaments, &c. so as to bring on rheumatic pains, the sudden shock from the coldness of the water, and the rarefaction and relaxation that afterwards succeed, will do more in removing it than any of the hot Baths, which

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are only capable of relaxation and rarefaction. As soon as we are sensible that the obstructing cause is removed; we must then discontinue the use of the warm Bath, and advise the patient to have recourse to the cold Bath, with an intention to brace up the relaxed muscles.

Let us now, in a more minute manner, attend to the effects of the Bath upon the body, and we shall from thence be able to determine in what diseases it ought to be prescribed, and in what it ought to be forbid. By the sudden shock the blood is instantaneously driven from all the vessels which are near the surface, and of consequence is impelled upon the internal parts, which it continues to load as long as the external vessels are contracted by the cold. The muscular fibres are made to approximate to one another, and the smallest vessels, as well as the largest, are made to embrace their contents with a sudden spring. The heart labours, by frequent and strong contractions, to propel the sudden torrent of blood thrown upon its right Auricle and Ventricle, and the lungs, through which it must pass, receive

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it with difficulty. Hence it is obvious that those who have weak lungs should proceed with great caution in the use of the Bath.

In a few minutes an agreeable warmth succeeds the former sensation, and the blood, which before had been impelled upon the heart, lungs, and abdominal viscera, is now forced back again towards the surface, by the increased action of the heart and arterial system. By these reciprocal actions the blood is increased in volume and momentum, and as the solids, at this time, are evidently in a state of relaxation, the red globules are enabled to pass through some vessels which before were only pervious to those of the serous order. During this universal relaxation the bulbous veins upon the surface of the skin have an opportunity of drinking up the most elementary parts of the water, and the exhalant arteries, for the same reason, are encouraged to breathe forth their contents with freedom. At the same time some part of the water must be supposed to insinuate itself between the fibres of the muscles to serve as a softening fomentation to them, and

thereby assist in removing diseases arising from a rigid fibre. I do not find that the pores of the skin can at any time be so much relaxed, by these waters, as to be the means of producing such copious sweats as are usual after coming out of the Baths in *Somersetshire*. In many cases this may be the great advantage of the waters of *Buxton*, and yet a greater degree of relaxation is frequently required. At present the natural temperature of these waters confines and limits their efficacy to certain diseases, but I am happy to say that by an easy process they may be brought to any determinate heat, without occasioning the smallest alteration in their component parts. So circumstanced, they may become a powerful rival to the waters of *Bath*, in the cure of all diseases where temperature alone is the medical consideration.

There are few diseases which require bathing above once in twenty-four hours, and according to the nature of the case the time of remaining in the bath must be shortened or protracted. If it be short it operates much after the manner of

a river bath in the height of summer; but if the patient chuses to remain in the water above four minutes, the relaxing power of the Bath will then begin to take place. The morning, about an hour before breakfast, is the usual time for bathing; though any time of the day may be proper, if not too soon after eating. Few people drink above three pints of the water in a day; but if their stomachs can well bear it, and the nature of the case requires it, they may safely increase the quantity. The only sensible operation of these waters is by urine; and as it sometimes happens that they do not pass off freely, it will be advisable to take a tea-spoonful of sweet spirit of nitre in the first glass of the water, and afterwards take the air on horseback, or in any other manner, so as to shake the abdominal viscera. This method seldom or never fails of success.

The best way of drinking the waters is to begin with small quantities, and increase the doses as they are found to agree; but as it is impossible to lay down rules which can be absolute, either with respect to their external or internal use, the Patient

tient should always consult his Physician before he enters upon them.—It is a very good method to drink the waters for a few days before bathing; and as they are apt to occasion costiveness, it would not be amiss to use a little lenitive electuary, or any other suitable laxative, to prevent that inconvenience. In very plethoric habits bleeding ought to be premised.

There is one thing I most earnestly recommend, and that is, not to indulge the appetite which these waters give; for though the stomach be sufficiently strong to receive its contents, and the chylopoietic and sanguifying organs able to assimilate them into good blood, yet there is reason to fear that a fulness too suddenly induced may prove of dangerous consequence. *Semel multum et repente vel evacuare vel replere periculose.* Hippocr.

It is a common practice at *Buxton* for people to indulge themselves with the free use of butter in a morning; but I would advise them to be more moderate in that article, as it is apt to grow rancid.

rancid upon weak stomachs, and may prevent the good effect of the waters upon that organ; a thing much to be attended to.

The usual season for drinking the waters, is from the beginning of *May* to the latter end of *October*; but if the patient requires a longer perseverance, he may safely use them all the winter, as they are found, upon repeated trials, to be equally good in all seasons.

I shall conclude this account of *Buxton* waters with observing, that there, as well as in most other places of public resort, much of the patient's recovery depends upon the change of air, diet, and company, and on that account every one ought to make those necessary assistants contribute, as much as possible, to his advantage.

F I N T S.

YORK, May 20, 1793.

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